

FORM PTO-1390 (Modified)
(REV 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER

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U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/926109

INTERNATIONAL APPLICATION NO.
PCT/EP00/01411INTERNATIONAL FILING DATE
21 FEBRUARY 2000PRIORITY DATE CLAIMED
05 MARCH 1999

TITLE OF INVENTION

PRODUCTION OF A TEXTILE FLOOR COVERING HAVING MORE THAN ONE LAYER, USING AN AQUEOUS
POLYMER DISPERSION AS ADHESIVE

APPLICANT(S) FOR DO/EO/US

James SMITH, et al.


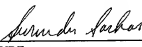
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/ISA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☐ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Request for Consideration of Documents in International Search Report
Notice of Priority / PCT/IB/304 / PCT/IB/308
Amended Sheets (pages 12 and 13)

U.S. APPLICATION NO. (IF UNKNOWN, EPO NO.) 097/926109		INTERNATIONAL APPLICATION NO. PCT/EP00/01411		ATTORNEY'S DOCKET NUMBER 213267US0PCT	
24. The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1000.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00				CALCULATIONS PTO USE ONLY	
				ENTER APPROPRIATE BASIC FEE AMOUNT =	
Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)). <input type="checkbox"/> 20 <input type="checkbox"/> 30				\$0.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	13 - 20 =	0	x \$18.00	\$0.00	
Independent claims	2 - 3 =	0	x \$80.00	\$0.00	
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>				\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$860.00	
<input type="checkbox"/> Applicant claims small entity status. (See 37 CFR 1.27). The fees indicated above are reduced by 1/2.				\$0.00	
SUBTOTAL =				\$860.00	
Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)). <input type="checkbox"/> 20 <input type="checkbox"/> 30 +				\$0.00	
TOTAL NATIONAL FEE =				\$860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/>				\$0.00	
TOTAL FEES ENCLOSED =				\$860.00	
				Amount to be:	\$
				refunded	\$
				charged	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$860.00 to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 15-0030 . A duplicate copy of this sheet is enclosed. d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO:					
 22850			 SIGNATURE Norman F. Oblon NAME 24,618 REGISTRATION NUMBER Sep. 4 2001 DATE		
(703) 413-3000 Surinder Sachar Registration No. 34,423					

IN RE APPLICATION OF

JAMES SMITH ET AL

SERIAL NO: NEW U.S. PCT APPLN.
(Based on PCT/EP00/01411)

FILED: HERewith

FOR: PRODUCTION OF A TEXTILE
FLOOR COVERING HAVING
MORE THAN ONE LAYER,
USING AN AQUEOUS
POLYMER DISPERSION AS
ADHESIVE

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to examination on the merits, please amend the above-identified application as follows.

IN THE CLAIMS

Please amend the claims as follows:

3. (Amended) A textile floorcovering as claimed in claim 1, wherein the structural components present in the polymer A) are from 60 to 99.9% by weight of ethylene and from 0.1 to 40% by weight of an ethylenically unsaturated acid, based on polymer A).

4. (Amended) A textile floorcovering as claimed in, claim 1 wherein the structural components present in the polymer B) are from 60 to 99.9% by weight of vinylaromatics,

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dienes or mixtures of these and from 0.1 to 20% by weight of an ethylenically unsaturated acid, based on polymer B).

5. (Amended) A textile floorcovering as claimed in claim 1, wherein the adhesive also comprises a thickener.

7. (Amended) A textile floorcovering as claimed in claim 1, wherein the adhesive comprises less than 200 parts by weight, based on 100 parts by weight of the total of A) and B), of a filler.

8. (Amended) A textile floorcovering as claimed in claim 1, wherein no filler is present in the adhesive.

9. (Amended) A textile floorcovering as claimed in claim 1, which is a two-layer textile floorcovering in which a textile backing fabric has been adhesively bonded to a secondary backing.

10. (Amended) A textile floorcovering as claimed in claim 1, which is a tufted carpet.

11. (Amended) A process for producing a textile floorcovering as claimed in claim 1, which comprises applying from 20 g to 1000 g (dry) per m² of adhesive to one of the layer [sic] and adhesively bonding the layers to one another.

REMARKS

Claims 1-13 are active in the present application. The claims are amended to remove multiple dependencies. No new matter is added by these amendments. An action on the merits and allowance of the claims is solicited.

Respectfully submitted,

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Marked-Up Copy

Serial No:

Amendment Filed on:

09/04/01

IN THE CLAIMS

--3. (Amended) A textile floorcovering as claimed in claim 1 [or 2], wherein the structural components present in the polymer A) are from 60 to 99.9% by weight of ethylene and from 0.1 to 40% by weight of an ethylenically unsaturated acid, based on polymer A).

4. (Amended) A textile floorcovering as claimed in [any one of claims 1 to 3], claim 1 wherein the structural components present in the polymer B) are from 60 to 99.9% by weight of vinylaromatics, dienes or mixtures of these and from 0.1 to 20% by weight of an ethylenically unsaturated acid, based on polymer B).

5. (Amended) A textile floorcovering as claimed in [any one of claims 1 to 4] claim 1, wherein the adhesive also comprises a thickener.

7. (Amended) A textile floorcovering as claimed in [any one of claims 1 to 6] claim 1, wherein the adhesive comprises less than 200 parts by weight, based on 100 parts by weight of the total of A) and B), of a filler.

8. (Amended) A textile floorcovering as claimed in [any one of claims 1 to 7] claim 1, wherein no filler is present in the adhesive.

9. (Amended) A textile floorcovering as claimed in [any one of claims 1 to 8] claim 1, which is a two-layer textile floorcovering in which a textile backing fabric has been adhesively bonded to a secondary backing.

10. (Amended) A textile floorcovering as claimed in [any one of claims 1 to 9] claim 1, which is a tufted carpet.

11. (Amended) A process for producing a textile floorcovering as claimed in [any one of claims 1 to 10] claim 1, which comprises applying from 20 g to 1000 g (dry) per m² of adhesive to one of the layer [sic] and adhesively bonding the layers to one another.--

Production of a textile floorcovering having more than one layer,
using an aqueous polymer dispersion as adhesive

- 5 The invention relates to textile floorcoverings composed of more than one layer, wherein the layers have been bonded by an adhesive which comprises, as binder, an aqueous dispersion of a mixture made from a polymer A) at least 60% by weight of which is composed of ethylene and from a polymer B) at least 60% by weight of which is composed of vinylaromatics, dienes or mixtures of these.

The invention further relates to a process for producing this floorcovering, and also to an adhesive which is suitable for

- 15 producing the floorcoverings.

- In producing tufted carpets a thread (pile material) is tufted through a backing fabric, i.e. pulled and then fixed by applying a binder (precoat). The binders used are usually aqueous polymer
20 dispersions, e.g. styrene-butadiene copolymers. To improve the performance of the floorcovering a covering (secondary backing) is bonded to the tufted backing fabric. A suitable adhesive is again an aqueous polymer dispersion, and if desired this polymer dispersion may be identical with the polymer dispersion of the
25 precoat. The production of tufted carpets using styrene-butadiene copolymers is described, for example, in US 5348785. EP-A-753404 has disclosed the use of an adhesion promoter to increase the adhesion of the different layers of carpets. The adhesion promoter or adhesive used is a polyethylene dispersion.
30 Dispersions of this type are very expensive. In addition, according to EP-A-753404 another layer of polyethylene powder is needed.

- It would be desirable to have very high strength in the resultant
35 composite of tufted backing fabric and secondary backing while using very little adhesive.

It would also be desirable to have short drying times for the aqueous adhesive in order to allow high production rates.

- 40 The abovementioned requirements have not yet been satisfactorily fulfilled by currently known floorcoverings or processes for producing floorcoverings.

It is an object of the present invention to provide a floorcovering and a process for producing a floorcovering which fulfill the requirements to a very high degree.

- 5 We have found that this object is achieved by means of the floorcovering defined above, a process for its production and an aqueous adhesive suitable for producing the floorcovering.

The adhesive comprises, as binder, an aqueous dispersion. The
10 aqueous dispersion comprises an ethylene polymer A) and a free-radical-polymerized polymer B).

The ethylene polymer comprises at least 60% by weight, preferably at least 70% by weight, of ethylene.

15

The ethylene polymer A) comprises in particular

- a₁) from 60 to 99.9% by weight, preferably from 70 to 99.5% by weight and particularly preferably from 70 to 95% by weight,
20 of ethylene, and

20

a₂) from 0.1 to 40% by weight, preferably from 0.5 to 30% by weight and particularly preferably from 5 to 30% by weight, of an ethylenically unsaturated acid.

25

Particular ethylenically unsaturated acids a₂) are acrylic acid and methacrylic acid.

- Examples of other monomers a₃) copolymerizable with ethylene are
30 (meth)acrylates, in particular C₁-C₁₀ (meth)acrylates, such as methyl, ethyl, propyl, butyl or ethylhexyl (meth)acrylates, (meth)acrylonitrile, (meth)acrylamide and vinyl esters such as vinyl acetate or vinyl propionate.

- 35 The preparation processes for the ethylene polymers A are known to the skilled worker. Polymers of this type are prepared, for example, by (co)polymerization of ethylene in continuously operating tubular polymerization systems at pressures of from 500 to 5000 bar and at from 50 to 450°C, in the presence of
40 polymerization initiators which decompose to give free radicals.

- The molecular weights are generally from about 500 to 40000 Dalton, in particular from 5000 to 20000 Dalton (M_n). After the polymerization the polymer A) may preferably be converted into an
45 aqueous dispersion by pressure-emulsification, if desired with addition of a neutralizing agent.

This process of pressure-emulsifying polyethylene to give aqueous (secondary) dispersions is known to the skilled worker.

- Suitable neutralizing agents are preferably ammonia,
5 diethylamine, dimethylethanolamine, diethanolamine, etc.

- Conventional ionic or nonionic emulsifiers may also be used concomitantly for preparing the dispersion. The emulsions obtained of the polymer A) are preferably pale-color,
10 low-viscosity and finely dispersed with a solids content of from about 20 to 40% and a pH above 8.

- Polymer B is composed of at least 60% by weight, preferably at least 80% by weight, of vinylaromatics, dienes or mixtures of
15 these.

Preferred vinylaromatics are α -methylstyrene and styrene. Styrene is preferred.

- 20 Particular dienes are isoprene and butadiene. Butadiene is preferred.

The polymer B) preferably comprises

- 25 b₁) from 60 to 99.9% by weight of vinylaromatics, dienes or mixtures of these, and

b₂) from 0.1 to 20% by weight of ethylenically unsaturated acids, e.g. acrylic acid, methacrylic acid or itaconic acid.

30

It is particularly preferable for the content of compounds b₁) to be from 80 to 99.5% by weight and that of b₂) to be from 0.5 to 10% by weight.

- 35 Monomers b₁) are in particular mixtures of vinylaromatics and dienes in a weight ratio of from 90 : 10 to 20 : 80, particularly preferably from 80 : 20 to 40 : 60.

- The polymers B) are preferably prepared by emulsion
40 polymerization. In the emulsion polymerization the monomers may be polymerized in the usual way in the presence of a water-soluble initiator and of an emulsifier, preferably at from 30 to 95°C.

- 45 The free radical polymerization initiators used may be any of those capable of initiating a free-radical aqueous emulsion polymerization. These may be peroxides, e.g. alkali metal

- Combined systems built up from at least one organic reducing agent and at least one peroxide and/or hydroperoxide are also suitable, for example tert-butyl hydroperoxide and sodium hydroxymethanesulfinate or hydrogen peroxide and ascorbic acid. Other suitable combined systems have, in addition, a small amount of a metal compound which is soluble in the polymerization medium and whose metallic component can occur in more than one valence state, e.g. ascorbic acid/iron(II) sulfate/hydrogen peroxide. Instead of ascorbic acid here, use is frequently made of sodium hydroxymethanesulfinate, sodium sulfite, sodium hydrogensulfite or sodium metabisulfite, and instead of hydrogen peroxide use is frequently made of tert-butyl hydroperoxide or alkali metal peroxodisulfate and/or ammonium peroxodisulfates.

The amount of the free-radical initiators used is generally from 0.1 to 3% by weight, based on the total amount of the monomers to be polymerized. Particular preference is given to the use of

- 25 initiators comprising ammonium and/or alkali metal peroxodisulfates or, respectively, tert-butyl hydroperoxide in combination with a reducing agent.

The way in which the free-radical initiator system is added to the polymerization vessel during the course of the free-radical aqueous emulsion polymerization according to the invention is known to the skilled worker. It may either be completely within the initial charge of the polymerization vessel or utilized stepwise or continuously as required by its consumption during

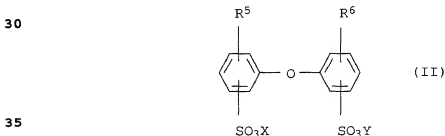
- 35 the course of the free-radical aqueous emulsion polymerization.
In any individual case this depends in a known manner both on the
chemical nature of the initiator system and on the polymerization
temperature. Preference is given to including a portion in the
initial charge and introducing the remainder to the
40 polymerization zone as required by consumption.

The usual known ionic and/or nonionic emulsifiers and/or protective colloids and/or stabilizers may be used for the emulsion polymerization.

Surface-active substances of this type are in principle the emulsifiers and protective colloids usually used as dispersing agents. A detailed account of suitable protective colloids is found in Houben-Weyl, Methoden der organischen Chemie, Vol.

- 5 XIV/I, Makromolekulare Stoffe, Georg-Thieme-Verlag, Stuttgart, 1961, pp. 411 - 420. Possible emulsifiers are either anionic, cationic or nonionic emulsifiers. It is preferable for the surface-active substances used to be exclusively emulsifiers, which, unlike the protective colloids, usually have relative
- 10 molecular weights below 1000. If mixtures of surface-active substances are used, the individual components of the material must, of course, be compatible with one another, and in case of doubt this can be checked using a few preliminary experiments.
- 15 The surface-active substances used preferably comprise anionic and nonionic emulsifiers. Examples of common coemulsifiers are ethoxylated fatty alcohols (EO number, from 3 to 50, alkyl: C₈ to C₃₆), ethoxylated mono-, di- and trialkylphenols (EO number: up to 50, alkyl: C₄ to C₉), alkali metal salts of the dialkyl
- 20 sulfosuccinates, and also the alkali metal salts and ammonium salts of alkyl sulfates (alkyl: C₈ to C₁₂), of an ethoxylated alkanol (EO number: from 4 to 30, alkyl: C₁₂ to C₁₈), of ethoxylated alkylphenols (EO number: from 3 to 50, alkyl: C₄ to C₉), of alkylsulfonic acids (alkyl: C₁₂ to C₁₈) or of
- 25 alkylarylsulfonic acids (alkyl: C₉ to C₁₈).

Other suitable dispersing agents are compounds of formula II



- where R⁵ and R⁶ are hydrogen or C₄-C₁₄-alkyl, but not simultaneously hydrogen, and X and Y may be alkali metal ions
- 40 and/or ammonium ions. R⁵, R⁶ are preferably hydrogen or linear or branched alkyl having from 6 to 18 carbon atoms, in particular 6, 12 or 16 carbon atoms, and are not simultaneously hydrogen. X and Y are preferably sodium, potassium or ammonium ions, particularly preferably sodium. Compounds II in which X and Y are sodium, R⁵ is
- 45 branched alkyl having 12 carbon atoms and R⁶ is hydrogen or R⁵ are particularly advantageous. Use is frequently made of industrial mixtures which have from 50 to 90% by weight of the monoalkylated

product, for example Dowfax® 2A1 (Dow Chemical Company trademark).

Other suitable emulsifiers may be found in Houben-Weyl, Methoden
5 der organischen Chemie, Vol. XIV/1, Makromolekulare Stoffe, Georg
Thieme-Verlag, Stuttgart, 1961, pp. 192 to 208.

To adjust the molecular weight, regulators may be used during the
polymerization. Examples of suitable regulators are compounds
10 containing -SH, for example mercaptoethanol, mercaptopropanol,
thiophenol, thioglycerol, ethyl thioglycolate, methyl
thioglycolate, tert-dodecyl mercaptan or mercaptoacetic acid.

The aqueous dispersion of the polymers A) and B) may be obtained
15 in a simple manner by mixing the aqueous dispersion of the
ethylene polymer A) with the aqueous dispersion of the polymer
B).

The proportion by weight of the polymer A) is preferably from 0.1
20 to 50%, particularly preferably from 0.5 to 20% and very
particularly preferably from 1 to 10%, based on the total weight
of A) + B). The proportion by weight of the polymer B) is
therefore preferably from 99.9 to 50%, particularly preferably
from 99.5 to 80% and very particularly preferably from 99 to 90%.

25 The adhesive preferably also comprises a thickener. Thickeners
are auxiliaries which increase viscosity.

The proportion by weight of the thickener is generally from 0.1
30 to 5 parts, preferably from 0.5 to 3 parts, particularly
preferably from 0.8 to 2 parts (dry and based on 100 parts by
weight of the total weight of A) and B).

Possible thickeners are the known thickeners, such as
35 polyurethane thickeners, cellulose, silica, silicates (e.g.
smectides), metal soaps, casein, starch, gelatin, polyvinyl
alcohol and polyvinylpyrrolidone.

Particularly suitable thickeners for the purposes of the present
40 invention are free-radical-polymerized polymers of ethylenically
unsaturated compounds. Preference is given to polymers over 50%
by weight of which has been built up from ethylenically
unsaturated acids, from ethylenically unsaturated amides or from
mixtures of these.

45

Ethylenically unsaturated acids which may be mentioned are acrylic acid, methacrylic acid, itaconic acid. Particular preference is given to acrylic acid and methacrylic acid. Amides which may be mentioned are in particular acrylamide and 5 methacrylamide.

- The polymer is particularly preferably composed of at least 70% by weight, very particularly preferably at least 90% by weight, of the ethylenically unsaturated acids and/or amides.
- 10 The polymer comprises in particular from 60 to 100% by weight, preferably from 80 to 99% by weight, of ethylenically unsaturated acids, and from 0 to 40% by weight, preferably from 1 to 20% by weight, of ethylenically unsaturated amides.

- 15 The thickener is preferably an aqueous dispersion, if desired with a content of organic cosolvents. Dispersing agents may be added in order to disperse the thickener in water. The thickeners may, however, also be added (e.g. as a powder) directly into the 20 aqueous dispersion of the polymers A) or B).

The thickener and/or the aqueous dispersion of the thickener may be added in a simple manner to the aqueous dispersion of the binder.

- 25 The adhesive may comprise other additives, e.g. fillers, such as chalk, alumina trihydrate or barium sulfate, or organic fillers, e.g. polyethylene powder or polypropylene powder.

- 30 The preferred filler content is generally from 150 to 400 parts by weight, based on 100 parts by weight of the total of A) and B). An advantage of the present invention is that the filler content is preferably less than 200 parts by weight, in particular less than 100 parts by weight, or even less than 50 35 parts by weight.

The adhesives require less filler than conventional adhesives, or no filler at all. Even without filler, high strength and good adhesion are achieved in the floorcovering.

- 40 The floorcovering built up from more than one layer is preferably composed of a textile backing fabric through which the threads have been tufted. The backing fabric is mostly composed of polypropylene or polyester. The threads are, for example, 45 polyamide fibers, polypropylene fibers, polyester fibers or natural fibers. To fix the threads in the backing fabric, a binder, e.g. a styrene-butadiene copolymer, is generally applied

- (precoat) to the reverse side of the tufted backing fabric. The precoat is usually applied as an aqueous dispersion which may have been filled with fillers, such as chalk, alumina trihydrate, barium sulfate or organic fillers, e.g. polyethylene powder. The precoat may also comprise antistats and other flame retardants, e.g. phosphoric ester derivatives and salts of a lower carboxylic acid with hygroscopic properties.

- The adhesive is then applied to the precoat, which may have been dried or may be wet. The amount applied is generally from 50 to 1500 g/m², preferably up to 1000 g/m², particularly preferably from 50 to 500 g/m² (dry, i.e. without water).

- The adhesive is preferably foamed on application, and the volume increase then improves its distribution on the surface.

- The adhesive bonding to the secondary backing can then take place. The adhesives dry very rapidly. Examples of secondary backings are sheets made from natural or synthetic materials, e.g. polyester nonwovens or else needlefelts. The materials are preferably webs made from woven or nonwoven fibres, or are needlefelts.

- The resultant floorcoverings having more than one layer feature very good layer adhesion, i.e. in particular of the secondary backing to the tufted backing fabric reinforced with precoat.

Examples

30 Production of floorcoverings

- A tufted backing fabric was provided with a precoat and dried. Adhesive was applied to the resultant precoat backing fabric, and the fabric was laminated to a textile secondary backing and dried. The amounts applied in g/m² are given in the tables.

The following aqueous precoats and adhesives were used in the individual experiments:

40 Table 1:

	Constituents	Parts by weight (dry)
45	Precoat 1	SN LD 611
		Chalk W 12
		Latekol D
		Solids content 78 %
	Precoat 2	SN LD 791
		Latekol D

	Constituents	Parts by weight (dry)
5	Precoat 3	SN LD 791
		Chalk W 12
		Latekol D
		Solids content 78 %
10	Adhesive 1	SN LD 611
		Chalk W 12
		Latekol D
		Solids content 78 %
15	Adhesive 2	SN LD 611
		Poligen WE 3
		Collacral HP
		Solids content 50 %
20	Adhesive 3	SN LD 611
		Polygen W3
		Collacral HP
		Solids content 47,5 %
25	Adhesive 4	SN LD 611
		Chalk W 12
		Latekol D
		Solids content 75 %
30	Adhesive 5	SN LD 611
		Latekol D
		Solids content 53 %
35	Adhesive 6	SN LD 611
		Polygen W3
		Latekol D
40	Adhesive 7	SN LD 611
		Polygen W3
		Latekol D

Meanings of terms:

- 30 SN LD 611: Styrofan® LD 611, butadiene/styrene copolymer, ethylene
 Poligen® WE 3: ethylene/acrylic acid copolymer
 Chalk W 12: Calcol W 12 from Alpha Calcit
 Collacral®: thickener, acrylic acid/acrylamide copolymer
 35 Latekol® D: thickener, polyacrylic acid

Performance tests

- 40 The strength of the bond between the precoated backing fabric and the secondary backing was determined. The bond strength (dry) was determined in N/5 cm at 23°C and 50% relative humidity using a Zwick (Ulm, Germany) model 1425 tensile testing machine. In each case the average force is given (F) together with the maximum force (Fmax). The bond strength of the wet composite was also
 45 determined (wet) after 12 hours of storage in water.

Table 2:

Bond strength (5/32 wool fiber tufted into woven polypropylene
(900 g/m²); secondary backing: polypropylene needlefelt, 375 g/m²)

5		Amount applied (dry)		dry		wet	
		Precoat	Adhesive	F	F max	F	F max
	Precoat 1, Adhesive 4*)	650	800	39.2	54.9	22.3	27.1
10	Precoat 1, Adhesive 2	650	230	44.6**)	64.6**)	33.1	37.9
	Precoat 1, Adhesive 2	650	180	72.9	83.0	50.4	35.5
	Precoat 1, Adhesive 3	650	230	45.6**)	73.0**)	43.4	53.2
15	Precoat 1 Adhesive 3	650	180	63.2	78.2	38.4	45.9
	Precoat 2, Adhesive 2	100	230	46.4**)	64.9**)	42.8	53.6
	Precoat 1, Adhesive 5*)	650	230	42.1	53.1	-	-
20	Precoat 1 Adhesive 7	650	230	41.9**)	65.5**)	44.2	52.5

*) for comparison

**) tufted threads were pulled out of the backing fabric

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Table 3:

Bond strength (1/8 polyamide fiber tufted into woven
polypropylene (625 g/m²); secondary backing: polypropylene
needlefelt (375 g/m²))

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35		Amount applied (dry)		dry		wet	
		Precoat	Adhesive	F	F max	F	F max
	Precoat 1, Adhesive 2	650	230	63.0	68.1	28.9	34.9
	Precoat 2, Adhesive 2	100	230	100.1	107.7	33.5	39.9

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Table 4:

Bond strength (5/32 polypropylene fiber tufted into polypropylene (650 g/m²); secondary backing: polypropylene needlefelt (330 g/m²))

5		Amount applied (dry)		dry		wet	
		Precoat	Adhesive	F	F max	F	F max
10	Precoat 3, Adhesive 4*)	780	550	10.7	16.3	6.4	7.7
	Precoat 3, Adhesive 2	780	160	34.0	40.8	21.6	26.3
	Precoat 2, Adhesive 2	90	160	24.1	27.7	10.9	12.7

15 The drying rate was also determined.

10.5 g of adhesive 1 were compared with

4.6 g of adhesive 6 (identical polymer content)

Drying was to constant weight

20 Adhesive 1: dry after 75 minutes

Adhesive 2: dry after 50 minutes

In industrial-scale production, therefore, speed can be 30% greater under identical conditions.

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New claims:

1. A textile floorcovering having more than one layer, wherein
5 the layers have been bonded by an adhesive which comprises,
as binder, an aqueous dispersion of a mixture made from a
polymer A), at least 60% by weight of which is composed of
ethylene and from a polymer B), at least 60% by weight of
10 which is composed of vinylaromatics, dienes or mixtures of
these.
2. A textile floorcovering as claimed in claim 1, wherein the
proportion by weight of the polymer A) is from 0.1 to 50% by
weight and that of B) is from 50 to 99.9% by weight, based on
15 the total of A) and B).
3. A textile floorcovering as claimed in claim 1 or 2, wherein
the structural components present in the polymer A) are from
60 to 99.9% by weight of ethylene and from 0.1 to 40% by
20 weight of an ethylenically unsaturated acid, based on polymer
A).
4. A textile floorcovering as claimed in any one of claims 1 to
3, wherein the structural components present in the polymer
25 B) are from 60 to 99.9% by weight of vinylaromatics, dienes
or mixtures of these and from 0.1 to 20% by weight of an
ethylenically unsaturated acid, based on polymer B).
5. A textile floorcovering as claimed in any one of claims 1 to
30 4, wherein the adhesive also comprises a thickener.
6. A textile floorcovering as claimed in claim 5, wherein the
thickener is a copolymer of ethylenically unsaturated
compounds at least 50% by weight of which are ethylenically
35 unsaturated acids, ethylenically unsaturated amides or
mixtures of these.
7. A textile floorcovering as claimed in any one of claims 1 to
6, wherein the adhesive comprises less than 200 parts by
40 weight, based on 100 parts by weight of the total of A) and
B), of a filler.
8. A textile floorcovering as claimed in any one of claims 1 to
7, wherein no filler is present in the adhesive.
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9. A textile floorcovering as claimed in any one of claims 1 to 8, which is a two-layer textile floorcovering in which a textile backing fabric has been adhesively bonded to a secondary backing.

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10. A textile floorcovering as claimed in any one of claims 1 to 9, which is a tufted carpet.

11. A process for producing a textile floorcovering as claimed in any one of claims 1 to 10, which comprises applying from 20 g to 1000 g (dry) per m² of adhesive to one of the layer [sic] and adhesively bonding the layers to one another.

12. A process for producing a textile floorcovering as claimed in claim 11, wherein the adhesive is applied to the reverse side of a tufted backing fabric and the tufted backing fabric is adhesively bonded to a secondary backing.

13. An aqueous adhesive comprising, as binder, an aqueous dispersion of a mixture made from a polymer A), at least 60% by weight of which is composed of ethylene and from a polymer B), at least 60% by weight of which is composed of vinylaromatics, dienes or mixtures of these, and comprising a thickener, where the thickener is a copolymer of ethylenically unsaturated compounds at least 50% by weight of which are ethylenically unsaturated acids, ethylenically unsaturated amides or mixtures of these.

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Production of a textile floorcovering having more than one layer, using an aqueous polymer dispersion as adhesive

5 Abstract

Textile floorcoverings composed of more than one layer have their layers bonded by an adhesive which comprises, as binder, an aqueous dispersion of a mixture made from a polymer A) at least 60% by weight of which is composed of ethylene and from a polymer B) at least 60% by weight of which is composed of vinylaromatics, dienes or mixtures of these.

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Declaration, Power of Attorney

Page 1 of 3

0050/049799

We (I), the undersigned inventor(s), hereby declare(s) that:

My residence, post office address and citizenship are as stated below next to my name,

We (I) believe that we are (I am) the original, first, and joint (sole) inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Production of a textile floorcovering having more than one layer, using an aqueous polymer dispersion as adhesive

the specification of which

☐ is attached hereto.

☐ was filed on _____ as

Application Serial No. _____

and amended on _____.

☒ was filed as PCT international application

Number PCT/EP00/01411 ✓

on February 21, 2000 ✓

and was amended under PCT Article 19

on _____ (if applicable).

We (I) hereby state that we (I) have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

We (I) acknowledge the duty to disclose information known to be material to the patentability of this application as defined in Section 1.56 of Title 37 Code of Federal Regulations.

We (I) hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed. Prior Foreign Application(s)

Application No.	Country	Day/Month/Year	Priority Claimed
19909819.0 ✓	Germany ✓	05 March 1999 ✓	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

0050/049799

We (I) hereby claim the benefit under Title 35, United States Codes, § 119(e) of any United States provisional application(s) listed below.

(Application Number)

(Filing Date)

(Application Number)

(Filing Date)

We (I) hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

Application Serial No.

Filing Date

Status (pending, patented,
abandoned)

And we (I) hereby appoint:

Norman F. Oblon, Registration Number 24, 618;
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our (my) attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith; and we (I) hereby request that all correspondence regarding this application be sent to the firm of **OBLON, SPIVAK, McCLELLAND, MAIER & NEUSTADT, P. C.**, whose Post Office Address is: **Fourth Floor, 1755 Jefferson Davis Highway, Arlington, Virginia 22202.**

We (I) declare that all statements made herein of our (my) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Declaration

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0050/049799

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